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A STUDY IN HUMAN GEOGRAPHY*

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MOUNTAIN PEOPLES IN RELATION TO THEIR SOIL

FUNDAMENTAL in the study of geographic environment is the relation of a people to its soil. From the nature of that soil, the proportion of it available for economic purposes, the possible methods of its exploitation, the amount and kind of its products, and the ease or difficulty in marketing the same, spring a long line of direct and indirect influences of geographic conditions which leave their stamp upon the national life and character.

Soil means primarily food. The constant concern of man is his food supply. Clothing, shelter, and even fuel, since its consumption varies greatly with the seasons and climate, are questions that force themselves upon his attention only intermittently; but the cry of the body for nourishment is persistent. For this reason desert areas, denying all sustenance, have no inhabitants except transitory caravans and pastoral nomads picking their way from oasis to oasis across the sandy wastes. Regions affording a limited or uncertain food supply, or yielding no minerals to be exchanged for food or made the basis of local industrial wealth, show a sparsity of population which reflects the meagre productivity of the land. To such regions belong most mountain systems, whether without ores and coal, like the Laurentian Highlands of Eastern Canada, the Scandinavian Mountains, the Swiss and Tyrolese Alps; or whether possessed of great mineral wealth left undeveloped because of inaccessibility, as in the Appalachian Mountains of eastern Kentucky and Tennessee; or because of the low economic status of their inhabitants, as in the rich ore-bearing ranges of the Chinese province of Shansi. True the exploitation of the mineral

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wealth of a highland region means in general only scattered mining camps with wide stretches of sparsely-inhabited wilderness between.

The resistance of mountains to the spread of population by their mere elevated surface serves often to exclude settlers. The difficulty of making a path up steep rocky slopes and through the dense forests usually covering them is deterrent enough, not to mention the general infertility, paucity of arable land, and harsher climatic conditions which characterize mountains in contrast to the plains. Hence, as a rule, only when the pressure of population in the lowlands becomes too great, do cabins and cornfields begin to creep up the base of the slopes. In 1840 the flood of population had spread westward in the United States as far as the ninety-seventh meridian and the north-south course of the Missouri River; but out of this sea of settlement the Catskill Mountains, the Adirondacks, the Southern Appalachians and the Ozark Highlands rose as so many islands of uninhabited wilderness, and they remain to-day areas of sparser population. The Mittelgebirge of Germany were not settled till the Middle Ages. Vast stretches of the Rocky Mountains, of the Laurentian Highlands, and of the Central Swiss Alps are practically uninhabited to-day.

A comparison of various countries will show a decrease in density of population with every increase of height beyond a certain altitude, except in a few favored mining regions, and in many tropical lands where better climatic conditions and freedom from malaria distribute settlements far above the steaming lowlands, and push the line of increasing density up to six thousand feet or more. In every mountain region the composition of the soil as affecting its fertility, the grade and exposure of the slopes as determining respectively the ease and success of tillage, the proximity of the highlands to teeming centers of population, and the general economic development of its people, are all factors in the equation, as well as altitude and zonal location.

In Great Britain, the sparsest population is found in the highland moors of Scotland, where the County of Sutherland has only 13 inhabitants to the square mile, and Invernesshire only 20. In these figures speaks also the remoteness of a far northern location. In the southern half of the island the sparsest populations are found in the Welsh county of Radnor, with 49 to the square mile, and in English Westmoreland with 85, both of them mountain regions, but reflecting in their larger figures their close proximity to the teeming industrial centers of South Wales and Lancaster respectively. In France the most thinly settled Departments are Basses-Alpes with 43 to the square mile and Hautes-Alpes with 50, which again owe even these figures in part to their situation on the margin of the densely populated

valley of the middle Rhone. Norway, almost wholly a mountain country, averages only 15 souls to the square mile. Less than a thousand square miles of its territory are under cultivation, and these are distributed in small deltas at the heads of the fiords, in low strips here and there along its western coasts, or in plains at the openings of its mountain valleys to the south-east. Here too is massed the larger part of its inhabitants. A barren granite soil, unfavorable zonal location, excessive rainfall, paucity of level land, leaving the "upright farm" predominant, and remoteness from any thickly settled areas, together with the resulting enormous emigration, have combined to keep down Norway's population.

If we turn to Switzerland, a country poor in the resources of its land but rich in the resourcefulness of its people, we find a high average density, 205 to the square mile; but this is due to the surprising industrial development of the marginal plains, which show in the Canton of Geneva 1200 to the square mile, and in Canton Zurich 640, while the rugged upland of Graubünden (Grisons) shows only 38 to the square mile, Uri only 46, and Wallis (Valais) only 56. How limited is the food supply of the country is evident from the fact that only 2,400 square miles, or fifteen per cent. of its area, can be ranked as arable land fit for garden, orchard or grain field, while a larger proportion, or twenty-eight per cent., is made wholly useless by watercourses, glaciers, rock and detritus. One-half of the entire country lies above the region where agriculture is possible; so that 3,066 square miles, or one-fourth of the area rated as productive, can be used only as pasture land, and another fourth, or 2,700 square miles, is meadow land yielding only hay.

These figures tell of the hard conditions of life characteristic of most mountain regions. Population under normal circumstances tends to settle in the productive lowlands at the foot of the ranges and along the borders of its drainage stream. Soon, however, the food supply becomes inadequate for the growing numbers, so that artificial means have to be employed to expand the area of arable land. The soil on the mountain slopes is so thin that it yields only a scanty return to the labor of tillage. Moreover, under the operations of plowing and harrowing, it is exposed to the danger of washing, so that after a few croppings the underlying rock of the mountain side may be laid bare, and all that was valuable in the quondam field deposited in the valley as silt or swept away to enrich the distant delta of the nearest trunk river.

To obviate this difficulty and to secure the desired increase of arable land, mountain peoples the world over have resorted to terrace agriculture. This means hand-made fields. Parallel walls, one above the other, are

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constructed on horizontal lines across the face of the steep slopes, and the intervals between are filled with earth, carried thither in baskets on the peasants' backs. The soil must be constantly renewed and enriched by manure in the same way, and the masonry of the retaining walls must be kept in good repair. Wherever possible, these costly terraced fields, if in the northern hemisphere, are located by preference on southward facing slopes, where the tilt of the land makes the fields catch the rays of the sun almost at right angles and thus counteracts the chill of the higher altitude, while the mountain behind protects the growing crops from the cold northern winds. Good arable land, being so limited in amount, commands a high price; and especially do choice terraced fields in vine-growing countries, since they make the best vineyards. Such fields in Switzerland will bring from $1,500 to $2,000 an acre, and are estimated to produce two bottles of wine for every square foot.

Such terrace agriculture is very rare in new countries, like the United States and Canada, because here the level lands are still more than adequate to the needs of the people; but in the more densely populated Old World it is widely distributed in mountainous areas. In Germany, where it is nearly identical with the culture of the vine, it is found along the steep slopes overlooking the valley of the Moselle and the Rhine; also in the Vosges Mountains, the Black Forest, and the Swabian Jura to the limited altitude to which the vine will flourish in these northern regions. In the Alps it is wide-spread, and not confined to the culture of the vine. The traveler passing along the Upper Rhone through the sunny Canton of Valais, follows these terraced fields almost as far as Fiesch (altitude 3458 feet), beyond which agriculture proper becomes more and more restricted on account of the elevation, and passes rapidly into the mere hay-making of a pastoral community. Between Leuk and Sierre not only the mountain sides but also the steep gravel hills constituting the old terminal moraine deposited by the receding Rhone glacier across the valley floor, are terraced to their very tops.

Terrace cultivation prevails in the mountains of Italy; it is utilized not only for the vine, but for olives, maize, oats, hemp, rye and flax. On the gentler declivities of the Apennines, the terraced walls are wider apart and lower than on the steep slopes of the Ligurian Alps along the Riviera or the ridges of Amalfi. This careful terrace cultivation, involving an immense expenditure of labor, has produced in Italy a class of superior gardeners. The Genoese are known all over their country for their skill in this sort of culture and so are the men from the mountain-walled plateau of the Abruzzi.

Turning further east, we find this kind of agriculture widely distributed

in the Himalayan lands. In the Vale of Kashmir the steep mountain sides are cultivated thus to a considerable height. The terraces are irrigated by artificial canals bringing the water for miles and miles along the hillsides from some distant glacier-fed stream, and support groves of peach, apricot, walnut, almond, flourishing vineyards and fields of grain. The mountain section of the native state of Nepal, also, presents the view of slopes cut into gigantic stairs, each step a field of waving rice kept saturated by irrigating streams from mountain springs; and the terraced slopes about the hill station of Simla help feed the summer population of English who there take refuge from the deadly heat of the plains. Yet farther north, terraced agriculture combined with irrigation is to be seen in the high Gilgit valleys, where Himalayas and Hindu Kush meet; and farther still along that mere scratch in the upheaved mass running down from the high Pamirs, called the Hunza Valley. Here live the once lawless robber tribes of the Hunzas and Nágaris, whose conquest cost the British a dangerous and expensive campaign in 1892, but whose extensive terraces of irrigated fields and evidences of skilful tillage give the whole country an appearance of civilization strangely at variance with the almost savage characters of its inhabitants. Yet farther in the wilds of the Central Asiatic highlands near the sources of the Sutlej and Indus rivers in Ladak or Western Tibet, this same form of cultivation is practised by the retarded or degraded Mongolian inhabitants. Here at an altitude of 11,000 feet or more, along mountain ranges of primitive rock yielding only a scant and sterile soil, terraces are laboriously constructed and manured with the burnt remains of animal excrements, which must first serve as fuel in this timberless land before they serve to fertilize the ground. In this stronghold of Buddhism almost every lamasery has its terraced fields, yielding abundant crops of grain and fruit.

All mountain agriculture must be laborious. The paucity of arable land precludes the possibility of letting fields lie fallow. Hence to prevent exhaustion these must be constantly and abundantly fertilized, all the more as conditions of excessive subaerial denudation in the present, as well as possible glacial scouring of the land in the past, have greatly attenuated the layer of soil called upon to support plant life. The Swiss or Tyrolese mountain farmer cherishes his manure pile as at once the source and badge of his wealth. At the end of the harvest, it is carted or carried in baskets not only to the terraces, but also to the wide alluvial fan that grows his oats and rye, and to the narrow plain along the river,—to vineyards, grain-fields, and meadows.

All mountain farming therefore finds an important ally in stock-raising; this, however, in higher altitudes restricting greatly the range of cereal

products, becomes the dominant interest of the inhabitants, while agriculture takes the subordinate place and is limited merely to the growing of hay and fodder for the winter feeding of the stock. Above the line of tree-growth flourish the natural summer pastures up to the limit of perpetual snow; and just below lies a zone, which, if cleared of its forests, supports a thick carpet of grass and herbage, though too cold to ripen grain.

Hence stock-raising tends to prevail in all high mountain regions. It involves a nomadic existence for those of the inhabitants who act as herdsmen, for in the spring, as soon as the upland pastures begin to grow green, the cattle, sheep and goats ascend step by step in the wake of Summer as she climbs the slopes, and return only in the fall to the villages. There they feed on the stubble of hay and grain-fields, till the rapidly increasing cold confines them in their low warm stables. These upland pastures have remained communal property, whether in Norway, Switzerland, Bavaria, Alpine Italy, Nepal or Kashmir, because to divide them is not practicable. In Europe their use is regulated. As a rule a villager may keep on the *Allmende* during the summer as many head of cattle as he is able to stall-feed during the winter; any in excess of this number must be paid for at a fixed rate to the village or communal treasury. Hay-sheds and cow-herds' or shepherds' huts mark these districts of temporary occupation in the highlands of Europe; and similarly in Asia are to be found small villages, inhabited only in summer by herdsmen tending their flocks, like the hamlet of Minamerg at the southern foot of the Borzil Pass over the Western Himalayan range, and Sonamerg (altitude 8,650 feet), at the foot of the Zoji-La Pass, both of them on the northern rim of the Vale of Kashmir.

But while one portion of the population is away tending the flocks and herds on the heights, the rest are busy at home securing grain and fodder for the winter feeding. This includes the cultivation of hardy crops like oats, rye and barley, which will mature at a great altitude; hay-making, and collecting bunches of twigs and even leaves for the less fastidious goats. In mountain regions of heavy rainfall, thick dew, and numerous cloudy days, it becomes a problem to get the hay dried and stored before a drenching shower comes. In many upland parts of Switzerland, therefore, the peasant on a clear morning cuts a limited amount of grass. This, with the help of his wife and children, he diligently turns and tosses at short intervals all day long, thus subjecting it to a rapid curing process by the action of the wind and the sun, whose rays are doubly effective in the rarified air of the heights. In the evening the hay is made up into bundles and carried on his back to the barn. In other parts of Switzerland the green hay is hung on horizontal poles arranged against the sunny side of the chalet and under its

projecting roof, thus exposed to the heat and protected from the rain till cured. In Norway the same purpose is achieved by setting up in the fields racks supporting long horizontal bars, over which the newly cut grass is hung. There it is exposed to the gentle fanning of the wind and penetrated by the warmth of the sun in the short intervals when the sky is not overcast; and during a shower it sheds the water immediately, so that a minimum of harm is done. In the mountains of Germany the hay is stacked on cone-shaped racks made of poles with lateral projections which support the grass, so that the air can circulate freely inside the hollow cone, which is lifted well above the ground. Elsewhere sharpened stakes provided with cross bars are simply driven into the ground and on these the hay is draped till cured. Mountain haymaking leaves nothing to chance; too much depends upon the crop.

It is not necessary to indicate in detail the geographical distribution of the stock-raising industry among mountain peoples, because it is almost universal. Nor have we space to discuss here the manufacture of dairy products, which is the natural concomitant of this industry, and which yields some of the chief articles of export contributed by the economic mountain peoples to the commerce of the world.

Let us pass rather to some of the more indirect results of geographic conditions in these highland regions. The obvious and persistent fact of mountain economy is the limited amount of food secured even by the most intelligent and untiring labor. In consequence, the natural increase of population presses constantly upon the limits of subsistence and the pressure is relieved only by emigration. Sometimes this is only seasonal; it takes place in the late fall after the summer work is over, and is due to the restricted industries possible in the mountain during the winter. It seems to be a recurrence of that nomadic note in the *motif* of mountain life,—that wandering in the summer upward to the borders of the snow, in winter downward to the sun-warmed plains. In the fall the Swiss come down to the cities in large numbers, seeking positions as servants or pastry-cooks. From the Basilicata Apennines of Southern Italy, from the mountains behind Modena and the mountainous Sorrento peninsula, the younger men go out to follow the peddler's trade, but they always return at the appointed time. Periodically many of the mountaineers of the Italian Alps migrate to the neighboring towns in search of work. Men from the Abruzzi become gardeners in the lowlands.

More often, however, permanent emigration is the result. Piedmontese, Fruilians and Bergamese from the Italian Alps leave their country in large numbers, many of them to find work in Marseilles and the other towns of

southern France. Since small wages suffice for their frugal wants, they can under-bid the Frenchman in the labor market. The Norwegians have gone in immense numbers to the United States, and Scotchmen of Highland birth are found scattered over the whole world. In 1903 Switzerland saw over five thousand of its people cross the ocean to America.

The less civilized mountain races, whose tastes or low economic status unfit them for emigration, solve the problem of an insufficient food supply by raiding their neighbors. The Kurds from the highlands of Asia Minor systematically descend to plunder or blackmail the inhabitants of the more fertile plains of Armenia. Muscovite dominion was extended over the Caucasus initially because of the persistent raids of its tribes into the plains of Southern Russia. Similarly the British in India have had to check the depredations of the Pathans from the Suláiman mountains and hill tribes from the Himalayas. Their last struggle was with the Hunzas. In spite of the careful cultivation practised by these people, their country was much over populated. The supply of grain was so inadequate that during the summer the people subsisted wholly on fruit, in order to reserve all the grain harvest for winter use. Therefore, when the passes over the Karakoram and Himalaya ranges were open in the spring and caravans began to move over the old established trade route between Kashmir and Yarkand,—when the Khirgiz nomads from the plains sought the pastures on the heights with their flocks and herds, the Hunza tribesmen found raiding on caravans and herds the easiest means of supplementing their slender resources. Hardy mountaineers as they were, and born fighters, they always conducted their expeditions successfully, and returned to the shelter of their fastnesses, laden with plunder and driving their captured flocks before them.

Those mountain people, on the other hand, who have attained a higher economic status and who relieve the pressure of population by emigration, are characterized by habits of industry and frugality which insure their success when they seek their fortunes in the new and generous lands of the western world.

Mozambique

North of the equator is a region of alternate currents, which change about a month after the change of the winds, running six months this way and six months that. These have long had, as Von Luschan, the eminent ethnologist of Berlin, told me, a great influence in carrying the higher arts from India to mix with the lower arts of Africa. The same currents had much to do with the early establishment of trade between the two countries, oversea traffic with favoring winds and waters being here much easier than traffic over desert lands.—W. M. Davis in *Boston Evening Transcript.*

COMMERCIAL GEOGRAPHY FOR SECONDARY SCHOOLS

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COMMERCIAL Geography is one of the youngest claimants for attention in the school curriculum. It is a great field well and widely recognized but, at least in America, it is essentially unorganized. Commerce is old, older than recorded history, and geography is some generations old; but Commercial Geography, with us, is not yet fairly above the horizon. In our secondary schools the subjects that are well presented are those in which the teacher has an opportunity to get well grounded in the college and university. This accounts very largely for the strong hold which Latin has still in our schools. Some of the older of us can remember how the sciences began to come into the high schools, and the sciences have gained a foothold in these schools just in proportion as they have been well established in the universities. In the matter of geography they fare better in Europe than we do. College work along the lines of commercial geography is offered in nearly every German speaking university and in all of the technical high schools—over a hundred places. In most of the French and Italian universities, too, nearly a hundred more, yet the subject is represented in barely a dozen English speaking universities. Truly there is some excuse for a lack of organization of the subject with us.

In the scope of Commercial Geography as we have it presented, there are two well defined points of view; the commodity, and the country. Difficulties begin in trying to limit the field. What shall be said about commodities? What *is* the geography of commodities? There are some things we may all agree upon: Areal distribution is geographic; so is the location of commercial centers; so are the routes of trade and most of the conditions determining these routes. But how about processes? Are they geographic? How far should they enter? We must pass judgment upon processes, according to whether they have a geographic bearing. Take the case of lumber. Why is the lumber so nearly stripped from the Great Lakes region, while a considerable resource, enough to last fifty or sixty years, still remains in the South? The answer is found largely in the processes by which the lumber is won. In the north when winter comes, rivers, swamps and lakes are frozen and become ideally perfect roads, making it possible to go anywhere with teams, and to draw extremely large loads with ease. On the contrary, in the South the seasons offer no advantages. There are no roads anywhere, unless they are specially built,—an extremely expensive undertak-

ing and even so the roadway is inferior in every way to the frozen river of the north. So, loads are small and lumbering is expensive.

Or, take the case of cotton manufacture. Why does starvation loom before the textile workers of Lancashire? Why is English textile supremacy threatened? Why did the King in a recent message to Parliament, dwell so earnestly upon the need of testing in every available colony, whether cotton might not be grown there with profit? The answer is not to be found in any change in climate; nor in the question of fuel for power; nor in the facilities or efficiency of transportation; nor directly in any change in the labor conditions in England. The answer lies in the invention of the ring spinning machine. This machine makes it possible in all coarser spinning to substitute for the highly skilled mule spinner, a six-year-old 'pore white' child in our southern states, and the three cent labor of women and children in India and China. Thus the revolution is on, and the cotton instead of going to Manchester to be spun, is made into cloth in the region where it is grown, and woe settles down over Lancashire. The method of spinning a thread on the ring machine has nothing of geography in it, but its influence becomes geographic in a very real way, as truly as a variation in precipitation or an untimely frost.

In the next place, how far shall we go in the treatment of a country? For an elementary course of a year, I am ready to say we may omit the country entirely. The ill logic of the political unit in geography is impressive, once it is challenged. It is true, statistics are national, more is the pity. But trade is *inter-regional*. And the conditions of production and transportation are mostly physiographic. Cotton grows best not under a monarchy, or for Germans or Americans, but in tropic or sub-tropic temperatures, with seven months at least free from frost, with the proper mixture of sun and rain, and with good transportation facilities between the plantation and the loom, and between the loom and the consumer. Forests grow with given temperatures and with certain annual and seasonal rain distribution, regardless of courts or parliaments. Animals thrive plentifully or sparsely according to the vegetable food supply, without regard to fiat or injunction. In short, in all the geography of the schools the State is of the least importance, and for most of the educative part of school work could be nearly ignored. The drill on the purely political and little else is a survival, like the vermiform appendix, or like the buttons on our coat sleeves. Nevertheless the region is a logical unity for detailed study, and even the country, at least the home country, will serve admirably as a unit for advanced work. All authors, so far, vacillate between these two points of view: Commodity—country. But with all respect to Mr. Chisholm and his followers, I be-

lieve the geographic element has been slighted in all this work, and we are over-taxing our pupils with mere dollars, and bushels and tons,—which is not education.

We can't do everything in one year. I firmly believe we are attempting too much. Suppose we give up the countries in our elementary course, and make the scope of the first year *Commerce and Commodities.* It makes a field big enough in all conscience. I would suggest the following:—

ANALYSIS OF AN ELEMENTARY COURSE.

I. *Commerce.*

1. Conditions controlling commerce:—The principles of trade; unequal endowment of regions, in advantage of position, in relief, minerals, soil, climate, the character of vegetation, industrial development, and standard of living of peoples.

Government interest:—Control of shipping, suppression of piracy, fixing of conditions in land transportation, tariffs, bounties, establishment of ports, the consular system, colonization, education.

Organization of industry:—Establishment of standards; weights, measures, time, money; establishment of the market, and the settling of accounts; organization and training of labor.

2. Means of transportation:—Conditions and forces of land transportation; of water transportation; function of water ways in fixing rates; character and significance of harbors; the logic of ocean routes.

Safeguards to life and property; elements of safety in land transportation; charting the coasts and seas; light houses; storm warnings; life saving service; quarantine; inspection; insurance.

3. Means of communication:—Society as an organism; the postal system; the parcels post; ocean cables; the telegraph; the telephone; wireless transmission.

4. Commercial tendencies:—From luxuries to necessaries; the equalizing of prices and supplies; the territorial division of labor. Movement of population:—to cities; winning the tropics. Educational tendencies.

II. *Commodities.*

1. The products of mines, quarries and wells:—Coal, iron, gold, stone, water, etc.

2. The products of hunting and fishing:—Furs, ivory, game, fish.

3. The forest resources:—Lumber, fuel, gums and resins, fruits, textiles, dyes, drugs, etc.

4. The significance of the soil:—Origin, translation, drainage, irrigation, maintenance of fertility.

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5. Products of the farm, orchard and range:—Cereals, roots, fruits, textiles, domesticated animals and their products.

6. Manufactures:—Foods, clothing, shelter; arts; machinery, etc.

7. The forces employed in manufacture and transportation:—the muscles of man and beast; wood and coal for steam; water power; other sources of power.

Part I of this analysis is not adequately presented anywhere. It is almost impossible to get our questions answered in some of these topics, and yet they are educative in a very high degree.

The subject thus outlined is a very large field. We cannot go much into detail in all these topics, and we do not need to. "One need not eat the whole pudding to know how it tastes." Out of the long list of topics we may choose some as types, and treat them fully; coal, the forest, corn, cotton, etc. Go fully into the physical factors involved in production and distribution and in the journey of the product to manufacturer and to market, regardless of political boundaries, and with an eye always to the way in which the industry reacts upon the people,—producer, carrier, consumer. For the human element is the substance of a permanent and universal interest. It is dominant in commercial geography, a proper study of which lays a foundation for the serious study of sociology, and for the solution of many social problems.

To present the study properly we need to take for granted: (1) The simple geography of location; the knowledge of the map; the form, size and space relations of the continents. (2) Elementary physiography, with its knowledge of the evolution of earth forms, and (3) a much more adequate knowledge than is at present given of the elements of meteorology and climatology,—the circulations of air and sea, and their significance in climate.

In presenting the subject the prime requisite is, of course, the teacher, and the character of his preparation needs to be carefully looked after. He must have wide interests and an insatiable appetite. He ought to approach his subject through the natural sciences. He needs to be well grounded in geology and physiography, and to have had special work in climatology. In biology, too, he ought to have had special training; in botany something more than the names of species, valuable as this may be; he needs all he can get of ecology. He must be able to trace with considerable accuracy the intimate dependence of organ and function upon the varying conditions of light, heat, moisture and soil; in zoology, too, he ought to have a familiar acquaintance with a type form in each of the great phyla, and to know at first hand how changes in the elements of the physical environment invite

changes in the organism, and that man is no exception to the rule. These natural sciences are fundamental to an adequate study of man and his institutions, and elementary courses, at least in economics and sociology, should follow as a part of the teacher's necessary equipment. Add to this a comprehensive training in general history and a reading knowledge of French and German, and we have the main lines of a liberal education, as well as a very excellent preparation for a specialization in commercial geography. It would be well if in vacations and the interim of the mastery of many books, the youth has had a chance to get some experience in the actual mechanics of some of the trades. To have earned his bread by the sweat of his bro on the farm, or in the mine, or foundry, or mill,—this is a training worth more as a part of real preparation, than all the frills of an ordinary education. For if he knows *work* and the condition and horizon of the worker, it will prove a source of endless interest and profit.

His power as a teacher will lie largely in an ability to inspire thought. This he may do by a logical presentation of the factors involved, with the causal relations always in view. The 'why' questions must be constantly in evidence and the nimbler he is in tracing effects back to causes, the better.

The next requisite is a text. By all means have a text. It saves work and worry. At the least it is a convenient reference book of facts. In several cases at present it is little else. Chisholm is the pioneer of all the English texts, and he remains the best of them all. He covers all commodities, and all countries, too, to 700 pages of closely printed octavo. All our American texts are fashioned after Chisholm, and our best school text was not even written by a teacher. They all attempt to mention all the things and places Chisholm does, and get it into a duodecimo book of 350 pages. Such condensation is dangerous. It comes to be a dictionary of statistics and of more or less unrelated facts. Its study is likely to cause mental indigestion. In its extreme condensation it is not education, and largely not geography. For let us not forget that education does not consist in memorizing statistics, nor in counting catalogues of things, any more than in memorizing capes and lists of cities. Education is achieved in the power of thinking; in the ability to trace effects back to causes; in finding out the why of things. And there is no subject more full of problems to be solved, than is commercial geography:—What has the position of the world's great highlands to do with the commercial supremacy of the Atlantic? What geographic handicaps have Boston and Philadelphia in commercial competition with New York? What is the effect of the Great Lakes and Erie Canal in fixing railway freight rates in America? What is the dominant factor in England's commercial power? What great social ad-

vantages are there in agriculture by irrigation? What can plant breeding do to increase the world's wealth? What part has cotton played in fixing social status and political attitude in the South? What is the economic significance of the discovery that the mosquito is the immediate cause of the spread of malaria and yellow fever? What industrial revolution is coming as coal grows scarce and dear? What powerful political and social influence grows out of the fact that England produces only seven per cent. of the bread she eats?

There are thousands of these questions. They meet us at every turn. They can not all be solved. But they can be opened up. We can, at least, begin to think along these lines.

These and kindred questions invite research, and send teacher and student to the library. And to become independent in the use of books and printed material generally, is one of the best things a student may learn. The work can be taken up topic by topic, and teacher and class may bring to the recitation contributions from a wide reading, special references being assigned to certain students to be reported on. Then each should have at least one topic per term upon which he may acquire a wide margin and an 'easy mind,'—a taste in real research. His written report on this is the best kind of exercise in English composition, and is better than an examination as a measure of the real power of the student. This also puts the library to the test and brings up out of the dust a wealth of material otherwise untouched. Not until such a subject comes along do we begin to realize the extent and value of our government publications. No other government is doing so large a service in scientific advance in productive lines, as our government is undertaking. In the Department of Agriculture alone over sixty serial publications are issued, nearly all of which are grist for our mill. So too the Department of the Interior, and of Commerce and Labor, to mention only two others, are issuing an enormous amount of very valuable matter for our work. And most of these publications may be on the shelves of each school, as issued, if the teacher is alive to his opportunities.

A very valuable adjunct to the text and to the presentation is a generous list of maps and graphs. And it is no disadvantage that for the most part graphs have to be made as used. Their best use is in showing a trend or tendency, or in making direct comparisons. Thus the increase in output of a commodity through a term of years, or the direct comparison of one region with another, in production, or of one commodity as compared with another, is shown to the eye at a glance, and in a way to be remembered. The graph is the 'short-hand' of statistics, and with the map is one of the teacher's strongest appliances. The number of side lights that can in this

illustrative way be brought to bear upon a topic is surprising. For example, studying corn in the United States: We want maps showing the distribution of glacial soil; of highlands and lowlands; of the annual rainfall; a graph of rain distribution by months in the growing season in the central region of maximum production; maps showing a sequence of cyclones and the way the rain is drawn in from the Gulf and the Atlantic; charts of the earliest and latest killing frosts; a graph of season length free from frosts; a map of corn production per square mile, in at least two tints to bring out the region of maximum production; map of corn production per acre; graph of corn production through the century with the other cereals in comparison; map of hogs per square mile; map of cattle per square mile; map showing location and magnitude of the great packing centers, of the dairy center, and of the distillery centers. These maps and graphs can easily be converted into lantern slides and made available for use before the whole class. In fact, with a lantern any fine map in atlas or book may be converted into a large wall map, in color, for about a dollar, and one could carry a hundred such maps in his hands at once. Thrown on the screen, all the class may be studying the one map at the same time and the recitation may be going on from the map. With the lantern also there is a world of illustrative material available in the way of photographs. The possibilities of the lantern in instruction are very great, and, I fear, not yet appreciated. I am glad to call attention to the splendid work the Keystone View Co., of Meadville, Pa., is doing in this connection. They have the services of highly skilled and competent men, who are making a careful study of the great industries, photographing processes at every critical step, and issuing a series of illustrations both in stereoscopic form and as lantern slides, each view accompanied with a short explanation or description. All teachers of geography in all grades will be glad to know of this work.

The actual material of the commodity in its various stages of preparation or manufacture has a high teaching value, and a museum is an ideal adjunct to the library. For example, the silk moth, the cocoon, and silk, raw, spun, reeled, woven and dyed. Or petroleum, raw, and its various products from benzine to axle grease, and from patent medicines to chewing gum. Or corn, the stalk, husk, and ear, and its products from meal and pone to starch, table syrup and whiskey, or from husk mats to parchment paper and smokeless powder. Or again, the actual rubber from sap to vulcanite. The list is almost endless, and it is not difficult to start the museum. Manufacturers are often good natured, and glad to co-operate. But I should not advise any school or teacher to accumulate material without dust proof and locked cases to protect it. Waiting for cases, however, would bar most schools at

present from having materials to use, and it is very gratifying to know that beginnings are already made in series of traveling museum collections, which have been provided in Chicago by a Museum Association, and in Philadelphia by the Commercial Museums. These collections are available at little or no expense to the school, and one collection may visit thirty or forty schools in the course of the year. This is an excellent work, and well worthy of finding favor in many other places.

Next to the museum is the excursion. To visit the factory or the mine, and actually see the work in progress, and the workers under normal conditions of production, is an education in itself. This is most valuable when following the topic which the work illustrates. Thus, following the study of iron, a visit to the rolling mill or foundry clinches the study as nothing else can. An itinerary may be provided beforehand calling attention to the things and processes to be seen, for people usually see what they are looking for. A written report after the excursion will add much of value, and will be helpful as an incentive to careful observation.

The subject of Commercial Geography properly presented stands as a logical connecting link between physiography and biology on the one hand, and history, economics and sociology on the other. The student properly trained in it will have his eyes open to a multitude of the great problems of modern society and will be well started in a way to know the forces involved and the method of solution of these problems. Above all he will be impressed with the idea that things do not happen,— they are caused, and that even social and economic problems may be solved by study and thought.

Test Problems on Daylight and Darkness

Do the following passages bear any traces of the latitude, season, or country in which they were written?

"Twilight and evening bell,
And soon after the dark!"

"The sun's rim dips; the stars rush out:
At one stride comes the dark."

"The night cometh, when no man can work."

"The long gray fields at night."

"The dawn comes up like thunder."

From *Simmon's and Richardson's Introduction to Practical Geography.*

SUGGESTIONS FOR THE TEACHING OF GEOGRAPHY IN THE UPPER GRADES

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THE study of geography in the elementary school is quite uniformly shaping itself into the form of a double 'spiral,' preceded by a somewhat detailed consideration of the home environment. This gives us (1) home geography, which is beginning to take on a definite form and to receive attention proportionate to its importance; (2) the first spiral, represented by the elementary text-book; and (3) the second spiral, represented by the larger or Grammar School Geography. A fair division of time places the home geography in the 3A and 4B grades, the elementary book in the 4A, 5B and 5A grades and begins the larger book in the sixth grade.

Although these three divisions of the work all conspire to give the pupil a knowledge of the earth's surface in its relation to man, they nevertheless differ quite widely in subject matter, aims, and methods of treatment. The method in home geography is almost entirely inductive. The pupil is led to study his environment first hand in order to gain a knowledge of and a mastery over it, and to accumulate a stock of concepts by means of which he may later interpret the geography of regions remote from home. Much that might be classed as 'nature study' forms a part of this work, and geography and nature study should not at this time be treated in separate classes.

In the study of the elementary book the pupil is given his first general view of the world. The concepts gained in home geography are drawn upon and applied. Description is a leading characteristic here and the teacher should constantly aim to make the work concrete and realistic. Much use should be made of pictures, and the pupils should be given vivid mental pictures of every region studied. The details of agriculture, lumbering, mining, and other industries should be brought out and made meaningful.

The distinctive feature of the second spiral in geography is the greater stress that is laid on the tracing of causal relations. While this feature is not omitted from the preceding work, it is nevertheless given a subordinate place; and on the other hand, the study of *facts* as such is by no means eliminated in the advanced work. An accurate knowledge of facts is a prime requisite in the deductive process, for only in the degree that we have this knowledge can we draw correct conclusions. From a knowledge of the position, size, contour, surface features, and prevailing winds the pupil is led

to infer what the climate, productions, and chief industries of the country should be. Approached in this way geography becomes a science, and the knowledge gained is rational and integrated, informing one not only of the facts, but also of the reason underlying the facts. Knowledge of this kind is more easily retained and gives one a sense of mastery over the subject-matter.

MATHEMATICAL AND PHYSICAL GEOGRAPHY: In order to gain an organized knowledge of geography, it is necessary that the pupils have at their command some of the leading facts and principles of mathematical and physical geography. These form the basis of all scientific geography, and a knowledge of them must be presupposed if the subject is to be understood from the bottom up. Ultimately not only the plant and animal life of the globe, but all the activities of man are regulated by them. Without a knowledge of these principles on the part of the class, a country could not be studied in the deductive manner above indicated. There is, therefore, ample justification for devoting perhaps a half year at the beginning of the larger book to the study of the fundamental facts and principles of mathematical and physical geography.

Owing to the immaturity of the pupils, the teacher must content himself with a somewhat elementary treatment of these subjects at this time. Some parts may profitably be left over for the review in the eighth grade or for the high school. But if the topics are carefully and logically presented in an inductive way by means of a globe and simple illustrations and experiments, even a sixth grade class will go far in understanding them. What is needed first of all is a clear and thorough knowledge of these things by the teacher. Many of the facts of mathematical geography may be presented to the class as problems to be discovered from the globe, and if this is ingeniously done comprehension is almost assured. As a problem to be so discovered may be mentioned the position of the tropics and polar circles; what locates them just where they are?

In the fifth and sixth grades the pupils are easily interested in the solar system and the constellations, and an elementary knowledge of these may be presented. The motions of the earth, or rather, the apparent motions of the heavens due to the motions of the earth, can be observed only when some of the constellations are known. The conception of the earth as a body floating in space seems to be hard for many people to grasp. The idea that it floats in the air must be guarded against. The child is greatly aided in getting the right conception by seeing the earth in its relation to the other planets,—a relation that is easily diagrammed. Furthermore, it is only as he sees the earth in space that the pupil can fully grasp the conceptions of 'up' and

'down,' without which he can never realize that the people on the other side of the earth walk with their feet down just as we do. It becomes apparent that the directions up and down are purely relative to the earth and do not exist in space.

There is one thing, however, that the teachers in the upper grades should never forget and that is this: The pupils' knowledge of the principles brought out in the first part of the larger book should be *used*. These principles should be used in connection with every continent, and nearly every country studied. Only in this way can a thorough knowledge of the general climatic conditions, and all that results therefrom, be gained. Whenever necessary the teacher should go back to the globe and to a review of the winds, rainfall, and ocean currents. When this is systematically done the pupils soon gain a mastery of the principles in hand, and the causes for the existence of deserts in certain regions, for the wet and dry seasons of California, Oregon and Washington, and other problems of that nature, will not form stumbling blocks to them.

The following is a suggestive outline to be used as a basis of study. It is in a few respects too comprehensive for the sixth grade, and the topics that are omitted here may be included in the final review. When an outline like this is used, the text-book should be made subordinate to it. That is, the work should be given according to the outline and the text used as a reference book. This will afford an easy opportunity to use several standard texts in the class. In general, every topic should be developed by the teacher before any text-book study on it is assigned.

OUTLINE: 1. Where is the earth?

(Bring out the conception that the earth is a body floating in space, unsupported. It does not float in the air, but the air is a part of the earth.)

2. Meaning of "up" and "down."
3. Other planets and solar system.

(Lead the children to look up the visible planets in the sky. If possible, point out some of the constellations for the children, especially those in the zodiac and those about the north pole.)

4. Shape of the earth.

(Bring out from five to ten proofs that the earth is a sphere and make sure that each is understood. Demonstrate to the class mathematically that the roughness caused by mountains is inconsiderable.)

5. Is the earth a perfect sphere?

Reasons for believing that it is flattened at the poles are:

a. Measurement.

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b. Weight increases toward poles.
c. Flattening must result from rotation.
d. Other planets are flattened at poles.

6. Size of the earth.
(Diameter approximately 8,000, circumference 25,000 miles. Make these numbers meaningful by means of problems. How long would it take a train to go 25,000 at the rate of 30 miles an hour? etc.)

7. Motions of the earth. Rotation and revolution.
a. Rotation: What moves visibly?
Proofs of rotation:
Deflection of falling bodies.
Foucault's pendulum experiment.
Flattening at poles.
Daily motion of heavens.
b. Results of Rotation:
Unit of time,—day.
Axis, poles, and equator.
Cardinal points.
Longitude.
Standard time.
International date line.
c. Revolution: What moves visibly?
Proof: The assumption that the earth revolves about the sun makes the mechanics of the solar system simple and conforms to the law of gravitation.
d. At this point bring out clearly the position of the earth in its orbit.
(1) Axis inclined 23½ degrees.
(2) Axis always parallel with itself.
e. Results of Revolution:
(1) *Year:* In connection with the length of the year the calendar should be taught. (The year is 365 days, 5 hours, 48 minutes, and 46 seconds in length.)
(2) *Seasons:* In teaching the cause of the seasons teach first the heating of the earth.
Why is it warmer at noon than in the morning or evening? Bring out two reasons distinctly, making them clear by means of diagrams:
(1) Rays cover smaller area at noon.
(2) Rays pass through less atmosphere.

Lead the class to see that these two factors apply in explaining the temperature difference between summer and winter, and that there is yet a third factor: There is much more sunshine in a day in summer than in winter.

Now let the pupils place the globe in position for spring, summer, fall, and winter, explaining every step. Lead them to see that three things—(1) inclination of axis, (2) parallelism of axis, and (3) revolution—are all necessary to produce the seasons.

(3) Latitude and Zones: Relate zones to seasons.

(1) Where do the sun's rays strike perpendicularly in summer, winter, spring, and autumn?

(2) How far north and how far south do the rays reach in each of these seasons?

(3) What, then, determines the boundaries of the zones? Are these boundaries artificial or natural divisions?

(4) Are the zones heat or light belts?

(5) Show how latitude naturally results from observation of distribution of sunlight at different times of year.

8. Climate and its relation to heat belts.

a. Climate:
   - A. Elements.
     1. Temperature.
     2. Moisture.
     3. Sunshine.
     4. Wind.
   - B. Determining factors.
     1. Latitude.
     2. Altitude.
     3. Winds and Ocean Currents.
     4. Proximity to Sea.
     5. Mountain Ranges.

Teach both A and B inductively.

b. Winds. Cause. (Use experiment.) Show relation to temperature.

(1) Trade winds. Direction. What determines direction?

(2) Belt of calms or doldrums; horse latitudes.

(3) Prevailing Westerlies.

(4) Monsoons.

(5) Land and sea breezes.

c. Rainfall. Causes. (Use experiments and familiar illustrations.) Give inductive lesson. Show relation to doldrums and mountain ranges. Study world distribution.

d. Ocean currents. Causes. Directions how determined?

THE STUDY OF A CONTINENT OR COUNTRY: The following outline may serve as a guide in studying a continent or country. Time and energy are saved when the teacher has a definite plan of procedure; but such a plan must not be allowed to crush out the individuality of the teacher, or to make the work monotonous. For this reason a plan should never be followed slavishly. Wholesome variety may be secured by judicious deviation from the outline, the guiding principle being the high points of interest in the subject-matter. Begin the study of a country with that feature which stands out most prominently. Such features are usually the result of surrounding conditions and hence make the logical as well as the psychological starting points. Italy may be approached through the historical and religious interest attaching to Rome, Spain through the characteristics of her people, Holland through the adverse conditions of life, and England through her advantageous position for commerce.

OUTLINE:

1. *Preparation.* Let us suppose that the continent to be studied is Asia. The first recitation can profitably be spent by talking with the class about Asia in general.
2. *Position.* As to latitude and longitude, in relation to the other continents. As to wind systems.
3. *Size and Extent.* Mostly in a comparative way, but the accurate determination by latitude and longitude is not to be neglected. This, as well as the area in square miles, may serve as bases for comparison, The size of the United States and that of the home state should be well known. To the east and west extensions the relation of longitude to time may be applied in comparison. For instance, the extreme east and west points of Asia are ten hours apart while similar points in the United States are but four hours apart.
4. *Surface.* Highlands and lowlands, mountain ranges, lakes, rivers, etc.
5. *Coast.* Regular or irregular?
   a. *Water forms.* Oceans, gulfs, seas, bays, straits, and channels.
   b. *Land forms.* Islands, capes, and peninsulas.

These topics appeal almost entirely to map study and should be accompanied by map drawing, the chief object of which is to teach form, size, and position. In map drawing the principle of going from the indefinite to the definite may be applied. Begin with a rough and quick free-hand drawing, or even with straight lines representing the general shape of the continent, and proceed gradually to more and more definiteness, ending with a somewhat finished map showing latitude and longitude. As guid-

ing lines in the more accurate maps the lines of latitude and longitude are better than artificial construction lines, for they teach position on the globe as well as act as guides. After the continent as a whole has been considered, and while the different countries are being studied, it will be of advantage to let each pupil make a progressive map.

6. Climate.
7. Industries.
8. Products.
9. Cities, routes of trade, etc.

The treatment of the last four topics should be essentially different from the first four. The distinguishing feature here should be logical deduction. The climate should be deduced from the position, ocean currents, prevailing winds, coast line, and surface features. What facts would give Europe the same climate as the United States or North America, and what facts would make the climate different? Productions may next be deduced from climate, position and coast and surface features; and the location of important cities and routes of trade mostly from surface features. After these things have been studied in this way they may be read up in the text and in reference books and discrepancies noted. In each case where the facts are found to be at variance with the deductions, the reasons for the disagreement should be determined if possible.

After a continent has been studied in this manner, the separate states or countries of that continent may be taken up according to the same outline; but the treatment may be much abridged in places. Climate, productions, and occupations are peculiar to physiographical rather than to political units. In these respects, therefore, political divisions may be most economically studied by noting their relation to continental regions.

In connection with the geographical work, the national song of a country should be learned, if possible, and before the country is left, a special 'day' may be set apart for it. We may have a Scotch day, a German day, a French day, or an English day, depending on the country under consideration. At that time the class may imagine itself transported to that country, and the literature, songs, customs, occupations, and scenery may be illustrated. Photographs, lantern slides, and stereoscopic views may be used to good advantage here.

THE STUDY OF A TRADE CENTER: St. Paul-Minneapolis as a type. (Adapted from McMurry's *Method of the Recitation.*)

1. *Preparation.* Where are these cities? What do you know about them? Why called Twin Cities? Why is Minneapolis sometimes called the 'flour city'? If history has been studied, recall Hennepin's

trip. Talk also in a general way about the wheat fields and prairies.

2. *Location.* Why two cities? Bring out the fact that St. Paul was located at the head of navigation on the Mississippi before the time of the railroads, and that after the railroad simplified the problem of transportation, a city could be started where it could take advantage of the water-power afforded by the falls of St. Anthony, thus giving rise to two cities near together. Organically, of course, these cities are but one trade center.
3. *Water power.* Of what use is the water power? This question leads naturally to the consideration of the saw-mills and flour-mills, and thence to lumbering and agriculture, both of which may be studied in detail. The guiding conception in the teacher's mind should be to trace cause and effect and to build up in the minds of the pupils a picture of the leading activities of that region. Much help may be derived here from pictures found in geographies, railroad folders, current magazines, etc.
4. *Lumbering.* A detailed consideration may include the pine forest, cutting and sawing the timber, the lumber camp, swamping or loading on cars, the drive, rafting, the saw-mill, and the transportation of logs and lumber down the Mississippi by means of steamboats. Planing mills, making sash, doors, mouldings, etc., may be considered i connection with saw-mills.

   What becomes of the lumber finished at St. Paul and Minneapolis? Some is used in the cities, but most is shipped to the prairies lying to the west, southwest, and northwest, where it is used in the smaller towns and by the farmers. It is now transported mostly by means of the railroads, which, on their return trips, bring back train loads of wheat to be made into flour in the big mills at Minneapolis. In this connection the function and importance of a railroad in developing a country may be brought out.
5. *Agriculture.* Next in order should be a somewhat detailed consideration of agriculture. This might include the preparation of the soil, seeding, harvesting, thrashing, elevators, transportation, and milling. The farmers are enabled to pay for their lumber, farm-machinery, etc., by means of their crops.

   What is done with the flour? Much is shipped to Hamburg and Liverpool via the Great Lakes and New York, and more to the central states via Chicago. This may lead to a consideration of trade routes and their relation to production, population, and physical features.
6. *Other industries.* What other industries would naturally spring up

at St. Paul and Minneapolis as the surrounding country developed?

a. Manufacturing:—Furniture, Wagons, farm implements, barrels, etc.

b. The cities would become a wholesale distributing center for dry goods, groceries, machinery, drugs, china ware, books, etc.

7. *Other cities.* Before leaving this section of the United States, Duluth and West Superior, and a number of cities along the upper Mississippi may be briefly studied. An imaginary trip may be taken down the river.

An outline like the above should be made to serve a larger purpose than the mere study of a trade center. An entire country should be reviewed in sections by means of it, after it has been studied as prescribed by the text-book. The entire United States might be reviewed about such centers as New York, Boston, and Philadelphia in the east, Charleston and New Orleans in the south, Chicago, St. Louis, and St. Paul-Minneapolis in the middle west, Denver and Butte in the mountain and mining region, and Seattle, Portland, and San Francisco on the Pacific coast.

APPARATUS AND COLLECTIONS: Practically all the geography outside of the home environment must be taught by the indirect method. For obvious reasons the class cannot deal directly with distant regions, but must depend on secondary sources of information. This fact, perhaps more than any other, makes geography the most difficult subject to teach satisfactorily in the elementary curriculum. In language, reading, spelling, arithmetic, and elementary science the object of study is dealt with more or less directly by the class, so that first-hand interest is aroused; while in history, although dealing with its subject matter indirectly, we have mostly narration which is inherently easier for the mind to follow than static description. In geography, however, most of our material must be secured from such secondary sources as text-books and books of travel, which are largely descriptive, and from maps and pictures.

Recognizing these limitations, we see the necessity of resorting to such devices as will aid in bringing concreteness and directness to the work. Every school should have a museum of specimens from all parts of the globe, for illustrative material is needed in nearly all classes, and almost every day. But if the school is lacking in this respect, much may still be done by the teacher. There is much that he may have in the way of specimens and pictures in his private equipment. Besides maps and globes, which are indispensable, some or all of the following are within easy reach of the teacher.

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1. *Pictures.*
   a. Photographs.
   b. Stereopticon views.
   c. Stereoscopic views.
   d. Views of the world (in book form).
   e. Magazine and newspaper cuts.
   f. Railroad folders and other advertising matter.
   g. Illustrations from books.

Sets of pictures illustrating scenes, trades, and industries may be obtained at reasonable rates from the Nature Study Publishing Co., 521-531 Wabash Ave., Chicago, and many things of value may be obtained from the departments of the United States government. This material should be collected and preserved in a systematic way. So as to be easily accessible, it should be classified and indexed, the card catalogue system according to the alphabet being perhaps the most serviceable.

2. *Products and Specimens.*
   a. The grains, as wheat, oats, etc.
   b. The plants and seed-pods of these grains.
   c. Wood of many kinds.
   d. Leaves and branches of these woods.
   e. Plants of cotton, tea, coffee, spices, etc.
   f. Curios from different countries.
   g. Rocks, soils, and minerals.

DEVICES AND SUGGESTIONS FOR REVIEW WORK: The ingenuity and resourcefulness of a teacher are nowhere more thoroughly exemplified than in a review exercise. No teaching exercise is more illuminating than a thoughtful review, while, on the other hand, no exercise is more stupefying than a review devoid of thought. In the review, the subject should, if possible, be approached from a standpoint different from that of the original presentation. The subject should be viewed in "new and unexpected ways, in new lights, in altered perspective, in fresh connections." (Chubb.) This insures continued interest, produces new lines of association, and leaves the knowledge in a more thoroughly integrated form. Cleverness at devices is no less essential in successful teaching than an intelligent review. They may be spoken of as the utensils of instruction. The following devices and suggestions may be used at the discretion of the teacher. Some of them will serve only as review exercises.

Mathematical geography may be reviewed and tested in topical recitations illustrated with the globe and drawings, and by means of problems

embodying the principles of the earth's motions and position in space. The following may serve as illustrations:

Where are the days always equal? Why?

Under what conditions would there be no change of day and night? Illustrate with globe.

In the year 1904 the earth rotated 367 times. Why? Discover with the globe.

Where do growing crops receive more sunlight, in Florida or in Montana? Why?

Are the zones natural or artificial divisions?

What change would bring the Arctic Circle through your home?

Under what conditions would there be no temperate zones?

Many interesting problems suggest themselves in regard to latitude, longitude, time, and the 'date line.' (For further suggestions see Jackson's *Astronomical Geography* and Gillan's *Lessons in Mathematical Geography.*)

Dissected maps may occasionally be brought in to good purpose in reviewing and impressing form, size, position, and direction. Is the pupil able to recognize by their shape the different states and countries when presented out of their relation to the entire map? and can he place them in their proper positions on the map? Comparative areas may be impressed by bringing dissected countries constructed on the same scale in juxtaposition. Maps to be used in this manner may readily be made by the pupils. Let the map be carefully drawn first and then dissected.

As a map review of a continent or state, an outline map may be placed on the board and the class may be called upon to supply the names and details. The rivers, position of cities, boundary-lines, etc., may or may not appear in the outline, depending on the nature of the review. With some variation this may be made a geography game. Geography games, occasionally used and judiciously conducted, bring about excellent results in clearness of knowledge. They are almost sure to be accompanied by keen attention and vigorous thought.

To test the ability of logical inference, a detailed map of 'nowhere' may be placed upon the board and the class may be asked to infer the probable climate, productions, and industries, giving reasons for every statement. In examination, a map of this nature may serve as a test in map reading.

Questions like the following 'sprung' on a class occasionally have a good effect.

1. Which is larger? and how much larger? Cuba or Montana? Texas or Australia? Lake Superior or the Caspian Sea?

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2. Name the largest state east of the Mississippi.

3. Which extends farther south, Africa or South America?

4. What foreign country would you reach in going due east from your home? In going due west?

5. Could you reach South America in going due south from your home? From Chicago? (In dealing with questions of size and direction, a globe is usually better than a map because maps are often much distorted toward the poles.)

Some aspects of geography may be treated to advantage in the language and arithmetic classes. This will do more than furnish material for these classes. It will direct attention to many things that would otherwise pass unnoticed, and by bringing the material into use, the knowledge will become more thoroughly organized.

The arithmetic class may deal with such topics as the population of states and cities, the areas of continents, states, and bodies of water, the output and navigability of rivers, exports and imports, and commerce in general; while in the language class may be treated the customs and manners of people, occasional imaginary journeys and descriptions, and the stories of agriculture, stock raising, lumbering, mining, etc.

BIBLIOGRAPHY: The following literature is recommended in the belief that books that broaden and deepen the teacher's knowledge in fields related to geography will do more for vital work in the class room than books on method. A more extended list may be found in Redway's *New Basis of Geography,* chapter XII.

Several text-books of geography, especially Frye, Redway and Hinman, Tarr and McMurry, and Dodge.

A set of geographical readers, especially Carpenter's.

A few good books of travel.

A text-book of physical geography, especially Davis' Elementary Physical Geography.

A text-book of commercial geography, as Adams' or Gannett, Garrison and Houston's.

A text-book of geology, as Brigham's.

A text-book of astronomy, as Comstock's or Bowen's.

Redway, *The New Basis of Geography,* Macmillan.

Fiske, *The Discovery of America,* Houghton, Mifflin & Co.

Geikie, *The Teaching of Geography,* Macmillan.

Redway, *The Reproduction of Geographic Forms,* Heath & Co.

Nichols, *Topics in Geography,* Heath & Co.

Russell, *Rivers of North America,* Putnam.

Jackson, *Astronomical Geography,* Heath & Co.

Gillan, *Mathematical Geography,* Gillan & Co., Milwaukee.

Teachers College Record, March, 1901. Devoted to geography in the Horace Mann Schools.

Valuable maps, charts, and data may be secured from departments of the United States government. The Coast Pilot Charts, Weather Bureau maps, and maps of the Geological Survey and the Coast and Goedetic Survey may be mentioned. A list of government maps suitable for school use may be found in *Government Maps for School Use,* Henry Holt & Co., New York.

The consular reports are rich in geographical information and are valuable for reference in the upper grades. The *Year Book of the Department of Agriculture* should be in every school library. These may be obtained free by application to your congressman.

Sets of pictures illustrating scenes, trades, and industries may be obtained from the Nature Study Publishing Co., 521-531 Wabash Ave., Chicago.

Some Notes on South Africa

The botanists told us of the extraordinary richness of the South African flora; for example, of four hundred and twenty known species of heather in the world, four hundred are found in the southwest coast belt of Cape Colony, and three hundred are found on Cape Town peninsula, an area about equal to that of the Isle of Wight. The dry interior afforded many examples of plant adjustment to aridity: small leaves, covered with down or felted hairs, to reduce evaporation; quick growth of annual plants, which reach maturity in the short wet season and remain as seeds for the rest of the year; perennials which shrivel as if dead in the dry months, and become bright and green after a few hours of rain: a double set of roots, the tap root going down deep for ground water, and a film of surface roots, as if to gather moisture from dew. Very curious are the plants (mostly Proteas) in which pollination is effected by birds instead of insects; not by birds of the humming type but by perching birds, and as if to meet them the flowers are turned backward from the end of a twig toward the branch. While the gums (Eucalyptus) and wattles (Acacias) have been beneficially introduced in great number from Australia, the prickly pear (Opuntia) from America has become a pest, even causing the abandonment of certain farms.

—W. M. Davis in *Boston Evening Transcript.*

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THE FUNCTION OF THE SCHOOL EXCURSION

BY L. W. HINE
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I.—The General Problem

IN the choice of the lines of activity to be retained in the curriculum, the question of relative values predominates. The consideration of the general problem of the excursion, then, will relate itself to the question, How fully does it lend itself to the ends and aims of education? Briefly stated, some of its main values are,—(1) That it deals with processes and products at first-hand, giving a basis of experience and therefore more participation on the part of the pupil. (2) It is vital and interesting because the pupil is brought not merely to the object but *into* it. (3) It gives motive for different phases of work to be utilized in many studies. (4) In the end it is true economy as it gives a reality to the subject in hand which much more time spent reading *about* these things could not give, and (5) not the least valuable is the social side which increases the desirable relations between the teacher and pupil and between the pupils themselves.

These values have long been recognized by the German and English schools and some governments, notably Switzerland and Japan, have gone so far as annually to appropriate definite amounts to be expended on excursions. It is interesting to note that as far back as Commenius the excursion was advocated along many different lines. He says to the pupil,—"Come on, let us go forth into the open air. There you shall view whatsoever God produced from the beginning and doth yet affect by Nature. Afterward we will go into *towns, shops, schools,* where you shall see how men do both apply those divine works to their uses and also instruct themselves in arts, manners and tongues. Then we will enter into houses, courts and palaces, to see in what manner communities of men are governed. At last we will visit temples where you shall observe how diversely mortals seek to worship their creator."

Excursions differ very widely according to the bearing each one has upon the rest of the school work. Most of them may be classed as special excursions, where certain lines are laid out and followed to the exclusion of many other things by the way. The undifferentiated excursion is often very fruitful. Here many lines may be touched upon with the emphasis upon those in which most interest is developed at the time. Then there is the free excursion, ramble or cross country walk, where exercise and the social side predominate.

II. Concrete Examples

Some of these values will be clearer after the following concrete examples: I. The trip to Briarcliff Dairy Farm with the sixth grade. Briarcliff was chosen from the subject-matter side as the most typical industry of New York state available for inspection, and it formed the nucleus of the work on industries of the state which were to be studied in the geography. On the other hand, we found the children interested in the products of the dairy because they come into such immediate contact with the milk and its products, although most of them were very ignorant as to the relations between the grass in the meadow and the milk in the bottle at the door. Before the trip, a survey of the important industries of the state was taken and the problems of our milk supply begun in the geography and cooking. Here, as is usually the case, some important results of the trip preceded it as the study borrowed vitality from the coming event because the pupils felt its necessity.

The day on the farm was full of live experiences. From the train, the children discovered many evidences of important industries by the way. At the dairy we followed the course of the milk, brought from the barn, saw how it is put through the strainers and into the large tank by means of which eight bottles are rapidly filled at once, saw the bottles capped, packed in ice and placed in the refrigerator car on the track at the door, ready for the trip to the city. The washing and sterilizing of the bottles and the care to keep everything clean were emphasized. The processes of separating the cream and making of butter were followed up. Then the care of the cows in the pasture and the barn and the special care of the calves showed the necessity for hygiene among the animals.

The mathematics work was especially valuable in giving the children physical concepts of area in which the teachers gladly participated. Naturally, the ideas of an acre were erroneous. Four pupils were asked to imagine an acre and to place themselves on its four corners. Measurement showed this was four rods on a side or one-tenth of an actual acre. Then one side of a real acre, ten by sixteen rods, was paced off and measured. The other side was estimated by four or five, each of them being several rods out of the way. One of the pupils was only one rod short on the sixteen rod side. We found afterward that this was undoubtedly due to the fact that the boy had lived all summer near a playground exactly one acre in size and he had a muscular feeling of an acre. Then one side of the acre was marked off by sixteen pupils, each one representing a rod. Here was a physical demonstration of area which we are sure the children will carry with them.

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Among the most important of the after-results are the following,—The children had a first-hand experience with processes which before were mainly words, thus demonstrating to them what is back of words and leaving them better equipped to interpret other industries. In the geography, this made a nucleus for the study of the industries of the state, leading as it did to its larger agricultural industries and then to its minerals and topography. The written-work dealt with "What we saw on the way to Briarcliff," "The journey of the milk in the dairy," "How the milk is brought to the city," "Suggestions for building a dairy," and maps of the dairy regions of New York were made. The cooking for nearly two months received direct vital help from this excursion. The pupils went on the trip looking to see what precautions are used to keep milk clean and sweet. After the trip experiments were made to see which keeps sweet longer that which is sterilized or that which is not; that which is cool or that which is not; and that which is clean or not clean. The products of the milk, different methods of making butter and cheese were also studied. Then followed the topic of cleanliness; dirt in the household, kinds, source and remedy.

In the mathematics, work with distance, area, fencing and drawing to scale followed the field work.

The English at this time was especially alive, having its roots in the real experiences at the farm. Much interest centered about the conversations, the main motives being to tell those who did not go and to prepare records for others to be told in Assembly and at the coming Exhibit. Then the girls gave to the boys their experience in cooking. Letters were written to the proprietors of the farm thanking them for their courtesy, and the school photographs taken on the trip were classified and named.

The cost of this excursion was sixty cents per pupil.

The excursion of the third grade to Englewood, N. J., a little over a year ago shows how a trip may form the backbone for the work of the entire Fall. Preceding the trip, the story of Robinson Crusoe to the point where he begins a fortification was told the children. The following points were developed,—1. Crusoe's use of wax brought out a discussion of substances used for candles and a desire to make some for Christmas. 2. The fortification led to plans for a play fortification, estimation of number and size of sticks needed, and plan to observe ferry piles as suggesting size of actual piles. 3. In the Nature Study the distribution of seeds was taken up and the pupils wished to gather some. The study of corn and the aspect of the country in Autumn led to a desire to see them and to identify the birds and animals. The purposes of the coming excursion were told the children;—To pick bayberries for candles, To gather sticks for Robinson Crusoe's for-

tification, To see piles at the ferry and get an idea of his use of logs. The children added other purposes,—To gather seeds for the collection, see cornfield and brook, birds' nests and birds and animals in which they were interested.

On the excursion practically all of these aims were accomplished and several more. The weeks following yielded abundant material. In the English, compositions, words for songs, and spelling lessons,—music, original songs, individual and class,—manual work, preparation of sticks and making of sieves for straining the wax,—Art, sea-gulls sketched and candlesticks modeled,—Mathematics, weights and measures,—Nature Study, seeds and birds,—Additional work, the making of bayberry candles and apple-jelly, made from material gathered, were used at a luncheon for the second grade. The influence of this went still further, for the children saved their money at Thanksgiving time, bought apples and made jelly and sent it to the hospital.

III. New York City as an Excursion Center

The opportunities for excursions in New York and vicinity are exceptional and we ought to be familiar with those most available and worth while.

For Nature Study, the proximity to Central Park allows us many informal walks as well as chances to study birds and squirrels, the sheep in the pasture, the animals of the Zoo, the trees, leaves and seeds, seasonal work in the open and the weather records at the Arsenal, and evidences of glaciation, weathering, etc. To carry these lines further, we are very convenient to the country of New Jersey, New York, Long Island, etc., where woods and fields, brook, and seashore invite us to all kinds of botany, zoology and geography. When the pupils are interested in the story of the formation of the earth, we can find about us unusual evidences of different stages of its existence in the old and more recent rocks of Manhattan and vicinity and the interesting changes that have taken place since their formation by reason of vulcanism, weathering, glacial action, etc.

In numerous lines of the school work, the museums furnish an inexhaustible field. Their usefulness is increased many fold by the co-operative spirit of those in charge. They furnish guides for classes, set aside the lecture-room with stereopticon or material and someone to explain it. Materials for school collections are often donated. At the American Museum of Natural History we find innumerable fields for industrial and natural history work. Here, as well as at the Aquarium and the Zoological Park, the environment of different groups of animals is reproduced very accurately, from the nesting place of the robin in the blossoming apple-tree to

the haunts of the bison and the deer. At Bronx Park are the Botanical Gardens, the Conservatory and the Museum, with their out-door and in-door botany, and the industrial side of plant life, such as different stages in the growth and manufacture of cotton, flax, turpentine, medicines, etc.

The Children's Museum in Brooklyn is filling a need for interesting natural history material adapted for the child's use, arranged in an attractive manner with a library of collateral reading. The material is studied at the museum and some of it is loaned to the schools. It is not necessary to do more than suggest the possibilities at the Metropolitan Museum of Art.

Our work along industrial lines has been aided and will be more helped by excursions to see the inside of industrial life. Nowhere in the world are better opportunities to enter into the spirit of commerce as shown in the incessant activity in our harbor where we find so many varieties of vessels leaving their cargoes of freight and humanity, or preparing for their long journeys to different parts of the world. We have opportunities to enter into the activities of flour mills, grain elevators, silk factories, sugar refineries, potteries, cracker factories, and this list might be continued indefinitely.

Most of us agree that the theory of excursions is based upon sound psychology. We do admit, however, that we have not begun to use the opportunities around us on every hand. If education is to rest upon experience, if we are to train pupils in the realities of life, must we not utilize this real side of our curriculum, and help the pupil to enter into the life about him by contact with its realities?

Geography and the Other Sciences

Geography is the mother of all the sciences, and is still indespensable to most sciences. The history of its study goes back two thousand years. The astronomy of the ancients was mathematical geography, and nothing more. Geology became a science in the end of the eighteenth century. It extended a knowledge of physical geography over pre-historic times. Geology and geography overlap each other: and the true distinction seems to be that the geographer contemplates the present in the light of the changes that have taken place in the past, while the geologist studies the past in the light of the changes that are taking place in the present. History, as we all know, is another science which must be alike halt and blind without the aid of geography.

From The Scope and Uses of Geography, by C. R. Markham, *The Geographical Journal, December,* 1905.

EDITORIAL

STANDARDS IN SCHOOL GEOGRAPHY WORK

Teachers of geography in elementary or secondary schools often find it extremely difficult to hold students to a standard of work as high as would be expected in most other school subjects. To measure a pupil's efficiency in the subject by comparing his expressed ideas with the formal phrases of a text-book is to be unfair to the thoughtful pupil and to reduce the subject to mere memorizing, thus weakening its value as a contribution to a child's training. To read into a pupil's poor statements expressed in an individual way, the truth that he ought to have gained, is easy, and a recitation is often classed as good because the desired knowledge seems to be there though the pupil has not shown exactness, clearness or care in classifying his points and expressing results he has gained. It is much easier therefore to mark pupils' recitations when the questions are introduced by "where" than it is if "why" or "what" is the keyword. It is perhaps for this reason that formal state examinations in so many places are largely information questions to test a child's knowledge of "sailor geography."

In physical geography it is particularly hard to measure a pupil's results by comparison with a stereotyped standard. This is by no means to be desired for stereotyped statements of facts may not indicate any real knowledge of the subject. Hence the necessity that teachers, who are working to make their pupils think, should measure their pupils' progress in accordance with a definite standard. Each teacher, in all work in geography where reasoning is required, should have clearly in mind two things—the essential points or individual parts in the problem, and the relations between these points that must be brought out. Every pupil should be measured by this standard and should be carefully trained to meet it. Indefinite, incomplete unrelated answers should not be accepted any more than they would be in physics, chemistry or history.

If geography is ever to advance it must be because the standard of efficiency is constantly being raised and because what has been marked good under old standards is no longer acceptable under modern standards. Such standards are bound to come as a result of the increasing better learning of teachers of geography, of the improved text-books and better organized courses of study, all of which are so much more common now than they were ten or even five years ago.

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The authorities responsible for the general plan of school work should see to it therefore that they help the cause along by aiding the teachers and not counteract the influences of the advancing and efficient teachers. For state authorities to accept in their formal examinations results that no careful teacher would accept in a class-room is to lower the standard of efficiency and to weaken the teacher and the subject in the eyes of the pupils and the local school boards.

We have recently seen some published examination answers to a set of state papers in physical geography in which the results in certain questions were given a high relative value in the paper as a whole, when from the standpoint of accuracy of fact these answers hardly contained a glimmer of truth. To ask a pupil to "treat the subject of tides" for instance is to invite an indefinite unsatisfactory answer. To accept the following answer as satisfactory, as was evidently done in the case in mind, is to accept misinformation and confusion of ideas in place of a few well-ordered clear-cut replies such as ought to be the approved result.

"The tides are an incoming of the water every morning and evening. They are due to the curvature of the earth's surface. They seem to be large waves or water that is higher than the water in front and wash upon the shore at a greater distance than the water does at other times. The incoming at outgoing of the tides in the large sea ports and all along the sea coasts is watched for by the people. And ships that are loaded with cargoes are or wait until the out-going of the tide in order to help them out of the harbors with their loads. The people always be careful so as not to be within the tidal limit when it is in or about time for the tide to come in. The tides sometimes reach quite a ways upon the land and wash things away and at other times things are left. When the tide is coming in you can always tell as it is a great mountain of water and there is a roar of waters heard for some distance."

If such standards are still acceptable how can we expect good teachers to combine to do good work and when will geography cease to be considered one of the weakest secondary school sciences? Examining boards ought to realize that high standards, attainable by the best, ought to be rigidly held before the poor students and teachers as a goal to be reached, if they would be rewarded for their hard work. Poor standards ought not to be accepted and if examining officers do not know how to ask questions to secure good results, according to modern standards, they ought to learn from studying the work of the best teachers. This standard should be raised slowly but constantly and should keep pace with the improved standards demanded in teachers, in texts, in courses of study and in material equipment.

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REVIEW

A LABORATORY MANUAL IN PHYSICAL GEOGRAPHY: By Frank W. Darling. Exercises 55. Chicago and Boston; Atkinson, Mentzer and Grover, 1905.

A revised and enlarged edition of Mr. Frank W. Darling's Laboratory Manual in Physical Geography published two years ago has appeared under the title noted above.

The first manual was distinctly valuable but the new volume is still better. It outlines a logical course making good training possible even in the hands of a comparatively inexperienced teacher and offers, too, many suggestions that those familiar with the field may profitably adopt.

The fifty-five exercises which comprise the volume are apportioned as follows among the various departments of the subject. The sequence of topics is also indicated:—

The Earth as a Globe	8
The Atmosphere	21
Life Distribution	1
The Ocean	2
The Lands	23

While the more important subjects should receive the greater share of attention the work would be materially strengthened throughout by a more impartial division. A greater emphasis of those topics superficially treated would make it possible to base the entire study of the subject on the laboratory, the most desirable method except where field work may be introduced, and would also permit a choice of exercises on the part of the teacher.

As the figures quoted above would indicate, the treatment of the atmosphere and the lands is decidedly stronger than that of the other topics.

The order of the subjects treated is on the whole logical though "Life Distribution" should follow, not precede "The Ocean" and "The Lands." Shore lines, too, are out of place before the study of the other great land forms.

The questions are generally excellent in that they are clearly expressed, searching in character and that they lead logically to the principle to be deduced.

The manual contains good relief maps of the various continents, a supply of outline maps of the continents as well as of the world and a map showing the life regions of the world in colors. Space is reserved at the end of the volume for a record of the work, note paper and section paper also being furnished. The manual is probably the most complete in the field and will certainly meet with the success to which the thought and care evident in its production entitle it. C. B. K.

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RECENT PUBLICATIONS

LABORATORY AND FIELD EXERCISES IN PHYSICAL GEOGRAPHY. By Gilbert H. Trafton, pp. vi+90. Ginn & Co., Boston, 1905.

A simple and rational series of exercises in physical geography with the major emphasis, as is right, upon the land and the atmosphere. Definite and practical, excellent for classes in first years of secondary course. An appendix includes suggestions as to apparatus and gives references to the literature available on laboratory work in physical geography.

GEOGRAPHY OF SCIENCE. Specially prepared from the Tarr & McMurry series of geographies, to meet the requirements of the seventh year in the public schools of the city of New York. pp. vi+249. The Macmillan Company, New York, 1905.

A book with an unintelligible title prepared for the purpose indicated in the sub-title. Includes Geography of North America, General Geography, Europe, The United States compared with other countries, in the order given.

ECONOMIC GEOLOGY OF THE UNITED STATES. By Heinrich Ries, pp. xx+435. The Macmillan Company, 1905.

An authoritative text-book of Economic Geology, valuable for reference in commercial geography. Well illustrated and accompanied by an excellent index. To be reviewed later.

EARLY WESTERN TRAVELS. 1748-1846. Edited by Reuben G. Thwaites. Vol. XX including Part II of Gregg's Commerce of the Prairies, pp. 356. The Arthur H. Clark Company, Cleveland, Ohio, 1905.

This volume like its predecessor, noted last month, is particularly interesting on account of its faithful accounts of life in Mexico and New Mexico in the Thirties. The chapters on the animals and Indians on the prairies are especially valuable. Gregg's Commerce of the Prairies is considered by experts one of the most valuable reference volumes on the Southwest.

ARTICLES IN CURRENT GEOGRAPHIC MAGAZINES

AMERICAN SAMOA, Frank T. Chambers. *American Geographical Society Bulletin*. November.

An interesting illustrated descriptive account of Samoa and the life of the people.

THE RAILWAYS IN NEWFOUNDLAND, C. M. Skinner. *American Geographical Society Bulletin*, November.

An illustrated account of the little known region traversed by the new railroad across Newfoundland. Brings out many interesting points of a region generally considered as merely a fishing center.

THE TEACHING OF GEOGRAPHY IN THE SCHOOLS OF CUBA. *Scottish Geographical Magazine*, November.

Outline of the geography course in the common schools of Cuba. Interesting illustration of constant emphasis of home country.

THE NATURAL REGIONS OF THE WORLD. A. J. Herbertson. *The Geographical Teacher*. Autumn number.

Considers the divisions of the world in natural regions secondary to "unity of configuration, climate and vegetation." Most interesting tentative suggestions as to ways of dividing the world for teaching. Illustrated by maps.

NOTES

THE RAILWAYS IN NEWFOUNDLAND.—With little lift of grade, and following the considerable stream known as Harry's Brook, we strike the Humber, one of the rivers that so nearly split Newfoundland into an archipelago, for if it were sunk a few yards deeper into the sea it would be nine islands instead of one, all with the northeast-southwest axis. The Humber, broad in its lower reaches, narrows till we find its black torrent pouring westward through a gorge with tawny precipices overhanging a thousand feet above. We cross its tributary, Grand Lake, 56 miles long, at its foot, and then begins the climb toward the great barrens that roof the island and are feeding-grounds for caribou, which hunters are slaughtering by thousands, and which, like the human aborigines, the Beothuks, are doomed to extermination. The forest we are leaving, and that clothes much of the lower country, is of spruce, pine, fir, and tamarack; but there are fine specimens of birch, some maple, and the deep tangles of elder and various shrubs and field growths of our own country betoken fertility whenever the land shall be claimed for agriculture or for ranching. The wood thins presently, discovering what might be taken for clearings; these spaces widen to fields; and at the fall of night we rise into the vast, cold solitudes where granite *tolts,* or peaks crouch along the distance, lifting their heads toward the sunset; then the scene fades with an impression of immensity and the northern lights begin to dance.

These barrens are as impressive as the western plains, and resemble them at first glance; yet they differ, except in superficies. The plains are dry; the barrens soggy, and threaded by a thousand rills. The plains are stony and dusty; the barrens, the boulders strewn here and there are deceptively like pasture. The "moss," as they are also called, is a thick carpet, the woody stems of Indian tea and "goold-widdy" forming a warp, and grass, reeds, and reindeer-moss the woof. This carpet has been thickening for centuries, and although the surface appears dry and invites to rambles, you sink in it to the ankles, and sometimes to the knees. I am told that in a few places it is six feet deep. It holds the moisture which is visited on

the island in rains and fogs, and it collects in unseen hollows where a surface growth of blue flag denotes its presence. One needs rubber boots in exploring the barrens, and he finds advantage in following the elk tracks, which avoid many pitfalls that the moss conceals. Yet there is little danger from swamp or quicksand.

The crest of the island, near its center, is marked by a series of tolts, of which the Topsails and Hodges (2,200 feet) are conspicuous from the railroad, and, in crossing the divide at a height of 1,800 feet or so, one is apt to see white drifts beside the track, in the shadow of the snow fences, as late as July. For, although the cold is less intense than on our Western ranges, snow falls heavily in winter and traffic is stopped for weeks at a time. Gruesome tales are told of the sufferings of passengers when stalled fifty miles from a settlement.

At Dawe, which needs a microscope to discover it as a town, we reach the Exploits River, pouring from its sources in the Annieopsquolch Mountains, with many leaps and much chafing of its hilly shores, toward a bay filled with islands. We follow 40 of the 200 miles of this largest of the Newfoundland streams through wilderness, still unpeopled, then over a brief rise to the valley of the Gander, the streams of this country being often separated by the thinnest of partitions. And descending to these large, calm reaches, which are in marked contrast to the romantic cañon of the Humber, we still find the land clothed with primeval forest; but the hum of the saw-mill is heard in the land, and a tract half as large as New Jersey will be deforested if the Harmsworth pulp concession becomes effective, to the detriment of the soil and springs—a circumstance overlooked by the people in their hope of gain from the industrial development. There is hardly a break in the wilderness between the east coast and the west for agricultural or grazing purposes, and few present occasions for an interior village, except at the granite quarry near the Topsails. Nor need we look for an immediate settlement if the fisheries continue to prosper. They engage nearly a third of all the Newfoundlanders and represent almost the adult male population; still, there are 2,500 farmers, with an average of 34 acres apiece, and they raise cattle, sheep, hogs, and poultry; so that the agricultural idea is implanted, and some day there will be withdrawal from the bleak, rough coast, with its icy besetment, and devotion to less heroic toil than the pursuit of cod and whales. Here along the Gander, with its fertile alluvium, is room for a million homes.—*American Geographical Society Bulletin, November,* 1905.

Foreign Commerce of the Principal Ports of the World.—The following table, compiled in the Bureau of Statistics, Department of

Commerce and Labor of the United States, from latest available official sources, shows the foreign trade of the principal seaports of the world. In the case of the United States ports both the land and sea-borne commerce is given; in the case of some foreign ports the sea-borne commerce only is stated. The value of the transit trade, whenever available, has been included.

Value of commerce of principal ports of the world.

PORTS.	Year	Imports.	Exports	TOTAL COMMERCE
EUROPE.				
Great Britain.				
London, including Queensborough	1903	$842,547,306	$462,206,875	$1,304,754,181
Liverpool	1903	627,915,453	557,598,986	1,185,514,439
Hull	1903	158,653,074	97,597,239	256,250,313
Glasgow	1903	70,119,734	103,394,005	173,513,739
Southampton	1903	76,599,659	70,990,449	147,590,108
Manchester, including Runcorn	1903	98,688,995	45,244,167	143,933,162
Harwich	1903	94,433,941	22,810,512	117,244,453
Grimsby	1903	49,387,339	49,877,523	99,264,862
Leith	1903	67,095,366	13,482,299	80,577,663
Tyne ports	1903	48,916,122	37,346,699	86,262,821
Bristol	1903	62,052,849	10,486,933	72,539,782
Cardiff	1903	20,981,470	50,362,868	71,347,338
Germany.				
Hamburg	1903	*a*550,751,000	*a*430,765,000	*a* 981,516,000
Bremen	1903	*a*198,518,000	*a*93,939,000	*a* 292,457,000
France.				
Marseilles	1903	248,869,000	182,683,000	431,552,000
Havre	1903	213,619,000	150,524,000	364,143,000
Dunkirk	1903	118,639,000	25,381,000	144,020,000
Bordeaux	1903	48,850,000	60,046,000	108,896,000
Austria-Hungary.				
Trieste	1903	60,353,000	40,642,000	100,995,000
Belgium.				
Antwerp	1903	388,174,000	347,940,000	736,114,000
Russia.				
St. Petersburg	1902	50,871,000	30,336,000	81,207,000
Odessa	1902	31,779,000	59,693,000	91,472,000
Riga	1902	19,311,000	43,226,000	62,537,000
Spain.				
Barcelona	1903	60,728,000	21,870,000	82,598,000
Bilbao	1903	15,109,000	16,431,000	31,540,000
AMERICA.				
United States. b				
New York, N. Y.	1904	600,171,033	506,808,013	1,106,979,046
New Orleans, La.	1904	34,036,516	148,595,103	182,631,619
Boston and Charlestown, Mass.	1904	80,657,697	89,845,772	170,503,469

Galveston, Tex	1904	1,847,646	145,316,457	147,164,103
Philadelphia, Pa	1904	53,800,106	71,393,254	125,283,360
Baltimore, Md	1904	20,345,788	82,836,164	103,181,952
San Francisco, Cal	1904	37,542,978	32,547,181	70,090,159
Savannah, Ga	1904	924,061	53,770,382	54,694,443
Puget Sound, Wash	1904	11,285,096	22,729,580	34,014,676
Canada.				
Montreal	1904	80,561,275	67,844,729	148,406,004
Argentine Republic.				
Buenos Aires	1903	107,494,000	109,803,000	217,297,000
Brazil.				
Santos	1902	21,857,000	67,420,000	89,277,000
Rio de Janeiro	1902	49,500,000	32,515,000	82,015,000
Chile.				
Valparaiso	1903	29,247,000	4,440,000	33,687,000
ASIA.				
China.				
Shanghai	1903	118,989,000	69,150,000	188,139,000

a By sea only. *b* Year ending June 30.

THE SNOW-LINE.—An imaginary line joining the heights above which occurs perpetual snow is called the *snow-line or limit of perpetual snow.* Below the line, the heat of the sun is sufficient to melt all the snow that falls. The following is the height of the snow-line at various places:—

	Latitude	Height of Snow Line
Quito	0°	16,000 feet
South side of Himalayas	28 N.	16,000 "
North side of Himalayas	29 N.	20,000 "
Sierra Nevada	37 N.	11,000 "
North side of Alps	46 N.	8,000 "
South side of Alps	46 N.	9,000 "
North Cape	71 N.	2,000 "
Spitzbergen	78 N.	Near sea-level.

DO WE NEED A TEXT AT ALL?—The belief is held by many educationists that if our grade teachers were properly equipped in training and scholarship, there would be no place for the text-book. We have set up, in our pedagogical shrine, an ideal teacher, of high conceptions, high attainments, and high mettle, to whom we conceive the text-book merely as an impediment, prescribed by an undiscerning superintendent.

That this is a dangerous fallacy, however, it requires but a glance over the situation to show. Not all initiative is dependable, and not all the roads of individuality lead to Rome. Our profession is full of people with crochets and hobbies, and perhaps you and I are among the number. Too many of us poke hairpins into the course of study, to see the wheels go round, or possibly to make them turn the other way. Occasionally there arises

one who can blaze a new trail, but there are not many. For the rank and file of us tradition is by far the safest working platform; and with it under our feet we in the long run render our best service. So far as geography-teaching, at least, is concerned, no scheme superseding the text-book has ever been offered which has proven, in the estimate of schoolmen at large, acceptably inclusive and exclusive.

The text-book appears needful also for a diametrically opposite reason. It not only answers as a corrective against crochets and distorted perspective, but, on the other hand, it sustains, in a fair degree of continuity, the work of the great army of teachers who are troubled neither with crochets nor perspective. In a word, it is the only safeguard we have against the chaos of genius on the one hand, and the barren wastes of indifference, on the other. Those upon whom devolves the task of shaping the material and methods of elementary teaching must ever be conscious that they are purveyors, not to a few geniuses and zealots, but to a great body of average toilers, tolerably alike, and numbering, in our own country, nearly four hundred thousand head. Viewed in this practical light, the text-book, be its failings what they may, appears as a veritable life-buoy in the deep.—*From a Consideration of Geography Texts, Elementary School Teacher, October,* 1905.

THE RESULTS TO BE GAINED FROM THE STUDY OF GEOGRAPHY.—There is so much variety in the mental make-up of boys and girls that the study of geography in elementary schools ought not to be expected, even under ideal conditions, to lead to the same results in all cases; but a well-taught course in geography should lead an intelligent pupil toward if not to the following results:

1. An intelligent desire and a growing capacity to learn more about the world and its inhabitants; and with this, an understanding of the relative value of elementary text-books as mere outlines and summaries for beginners; of hand-books, treatises and atlases as works of reference; and of books of travel, and reports of scientific surveys and expeditions, and large-scale topographical maps as original sources of information.

2. Some practice in the use of hand-books, atlases, and original sources as a beginning of the excellent habit of looking up things; and the seeds of a liking for the enlightening recreation of following the world's geographical progress as recorded in reports and narratives of the more important explorations.

3. Such an understanding of the simpler principles of inorganic environment and organic response—of physiography and ontography—as shall

lead to an intelligent appreciation of new information, particularly in its human and economic relations.

4. Some observational acquaintance with local features, both physiographic and ontographic, sufficient to give conviction of the reality of unseen things, of which verbal descriptions or conventional graphic representations are given in books and maps; still better if local observation has been carried far enough to give ability to derive intelligent enjoyment from the opportunities of travel.

5. Some practice in the presentation of oral, written and graphic reports on facts seen in the field or studied in books or maps.

6. A beginning at least of the realization of the pupil's own place in the world and of his own part in the world's work.

7. Subordinate to all the above, as means are subordinate to the end, the names and locations of many places and peoples studied in their mutual relations and as examples of classes and principles, not as isolated, disconnected facts, and learned rather by use than by memory.

8. (In common with the results of other studies.) A disciplined adolescent mind, ready to make active attack upon life's problems.—*W. M. Davis.*

Coffee, Its Origin and Propagation, Its Introduction and Cultivation in Costa Rica.—Among the varied agricultural products which at present constitute the leading features of universal commerce, not one presents an instance of such rapid and extensive development as coffee.

The dissemination of knowledge of the useful qualities of the product is due to the Turks, and the original extension of its cultivation to the Dutch. The aromatic grain does not appear to have been thoroughly appreciated on its native soil, but on its transfer to foreign regions it arrived at a condition of greatness and prosperity. Indeed, so vast is the territorial extent at present devoted to its culture, and so many millions of laborers are employed thereon, while such enormous sums of money are invested in the industry, that coffee rightly takes first rank among the alimentary products of agriculture.

The most generally accepted account of the origin of the coffee plant places it as a product native to Asia and Africa, on the shores of the Red Sea; but opinion is divided as to the locality in which its utility was first demonstrated. Thus, while according to some authorities, the use of coffee was known in Abyssinia from the earliest times, others assert that it was introduced into that country about 900 years before the Christian era by certain half-civilized tribes of Upper Ethiopia. This latter seems to be

admitted as the more probable statement, but as is the case with other facts, the true history is lost in the obscurity of years.

The name is undoubtedly derived from Kaffa, a place in southern Abyssinia, where coffee grew wild in great profusion on the slopes of the mountains, and where, at the beginning of the fifteenth century, a beverage known as *cobo, cahove, coava,* or *cave* was prepared from a cultivated plant. Its use was also known in Arabia as well. From this point, knowledge of it extended to Constantinople and to the rest of Turkey, passing thence to Persia, and, by way of Cairo, throughout Egypt, during the sixteenth century. The first person attracting European attention to the plant was Rauwolf, who had known it in Aleppo, Syria, while the first botanical description of it was made by Prosper Alpinus in 1582. The Venetians first introduced it in that part of the world in 1624, and within twenty years it had become the universal beverage throughout southern Italy. England, which is now the great center of coffee trading, recognized its importance in 1650, and two years later opened public coffee houses in the Kingdom. Daniel Edwards, a Smyrna merchant, first imported it into the London market and a Greek by the name of Pasqua was given in charge of the coffee house. In France, coffee was introduced at the court of Louis XIV by an ambassador of Mohammed IV, and in 1669 and 1672 public coffee houses were opened in Marseilles and Paris, respectively. The first coffee house in Vienna, Austria, was opened in 1683, and in Berlin, Prussia, in 1711.

Attempts to extend the culture of coffee plantations were first made in 1650, when the Dutch carried small plants from Moca to the East Indies and, according to some authorities, planted them on the island of Bourbon, though others assert that Batavia was the site of the first planting. The results being found satisfactory, similar cultures were made on the island of Java, with good results. The plant was also carried by the Dutch to Amsterdam, whence, in 1714, a coffee tree was sent to Louis XIV, who had it cared for in the conservatories of the royal garden. It is said that from this plant, the first seeds were transported to America, and that it formed the basis of coffee growing in the West Indies. However, certain references indicate that in 1715 coffee was known in Santo Domingo and Haiti and that a Captain Declieux brought two plants to America in 1720, introducing it into the French colonies. It is also stated that the island of Martinique, in 1726, received a small coffee plant, from which point the seeds quickly spread to Santo Domingo, Guadeloupe, and Cayenne. In whatever manner it was accomplished, however, it is evident that the growing of coffee was known in America during the first quarter of the eighteenth century.

It was carried to Brazil from French Guiana in 1723, and the first efforts toward its propagation in the Province of Para did not give satisfactory results, as neither the soil nor climate of that section were favorable, but about fifty years later a Franciscan monk established a small plantation in the Province of Rio de Janeiro, and thence its culture extended to San Pablo, Minas Geraes, and Espiritu Santo, so that at present all the coffee of Brazil, which forms half the world's crop, is grown in these regions.

The plant was introduced into Cuba by Don Jose Antonio Gelabert in 1748, the seed having been carried from Santo Domingo. The results were primarily satisfactory, but its culture afterwards completely declined. Venezuela commenced coffee growing in 1774, owing to the initiative of a priest, Jose Antonio Mohedano, near Caracas. The first exportations consisted of 233 quintals and were made from the port of La Guaira in 1789. Mexico began this culture in 1802, and Colombia, at a later date.

Coffee growing was introduced into Costa Rica in 1796 by Don Francisco Xavier Navarro, a Spaniard, who transported the plant from Havana and planted it in the garden of his house at Cartago. As the seeds were obtainable from the plants, Señor Navarro distributed them, and in a short time coffee plants were growing in many of the gardens of the town. Thus the knowledge of the plant was disseminated, though at first, and in fact throughout the first decade of the eighteenth century, it was looked upon as an object of curiosity. The first two plants developed into large trees and were in existence until within the last twenty years, but have now entirely disappeared, leaving only a memory.

From Cartago, Father José Velarde carried the plant to San José in 1819, when the cultivation of coffee in Costa Rica really began, the credit being due to this priest. Thence the knowledge of the plant spread to the other Central American States. The Costa Ricans early recognized the importance of coffee as an article of commerce and developed its culture on an equal plane with sugar cane, cotton, cacao, and other products adapted to the soil of the country. With this object the Municipal Council of Cartago issued various regulations in 1821, the same being effected by the Government Council, which succeeded the Colonial Government in the years subsequent to the declaration of independence. Upon the establishment of the Federation of Central America, Don Juan Mora, First Chief Executive of Costa Rica, in 1825, excepted coffee among other articles from the onerous tax of 10 per cent., thus stimulating its cultivation so that within two years it had become an important product in that section of the Republic. Later, during the second administration of Señor Mora, by a decree of the National Assembly, free grants of public lands were made for the growing

of coffee plantations or for tracts on which, during a term of five years, such plantations should be made; furthermore, double grants were made to such persons who should encourage the growing of edible plants.

Owing to these measures, a very short time elapsed before Costa Rican coffee, as a native plant, became an article of commerce, and in 1832, George Stipell, a German merchant of San José, made the first shipment of the article, sending the first bagfuls of this valuable produce to Chile. The coffee of Costa Rica immediately gained favor and the extent of native plantations increased in proportion to the demand in foreign markets.

Later, in 1840, President Don Braulio Carrillo, authorized the sale of the municipal lands of Las Pavas, near San José, with the express conditions that they should be planted in coffee, according to the most improved methods, so that these plantations might serve as models. While the influence of such action was important, it did not, however, attain the value hoped for.

After the dissolution of the Federation of Central America and during the Government of Don Juan Rafael Mora, inaugurated in 1849, agriculture made great progress in Costa Rica, aided thereto by the development of public highways. The cultivation of coffee and sugar cane so absorbed the attention of the country that in 1861 the quantity of coffee exported amounted to 4,600,000 kilograms, notwithstanding the scarcity of labor and of capital, and in spite of the war against Walker in 1856 and 1857, the cholera, and the revolutions of 1859 and 1860.

Coffee growing continued to increase, and, in 1884, the product reached 18,500,000 kilograms, and although it has somewhat declined of late years (in spite of the great extension of lands adapted to its culture, as those of Turrialba, where the plant grows prodigally), this decline is due principally to the falling off in its price in foreign markets and to the scarcity of labor occasioned by the development of trade in other branches, among which (aside from gold exports, which were valued at $228,237 in 1903, and forest products, worth $156,782) may be cited cacao, with a crop of 80,532 kilograms of excellent quality, and bananas to the amount of 5,139,063 bunches.—*Monthly Bulletin, International Bureau of the American Republics,* October, 1904.

ALLIGATORS IN VENEZUELA.—Though but few alligator skins are sent abroad from here, it is not on account of scarcity of alligators. It is strange that nobody has taken up the hunting of these reptiles. They are here in the lakes and lagoons and rivers in untold numbers and of all sizes. The skins are well worth securing, and alligator oil brings a high price, being used for medical purposes. In the Rio de Oro and the Rio

Tarra I have seen thousands of large alligators which came up to deposit their eggs on the sand banks during the dry season. It is the same in all the hundreds of streams which flow into the lake of Maracaibo. Alligator hunting is fine sport, and, in my opinion, would be a paying business. *Consular Reports, October, 1904.*

THE HEIGHT OF MOUNT WHITNEY.—Mr. Henry Gannett informs us that the U. S. Geological Survey last summer ran a line of levels from the Pacific Coast by way of Los Angeles and Mohave and Owens Lake Valley to the summit of Mount Whitney, giving it a height of 14,499 feet. This entire line was double-rodded, and is doubtless accurate to within a foot. This appears to settle the much-disputed question of the height of this peak. It slightly exceeds in height any other mountain in the United States, outside of Alaska. Mount Rainier, in the State of Washington, was determined by 13 vertical angles to be 14,363 feet high; so that Mount Whitney surpasses it by more than 100 feet. It is also higher than the loftiest summit in Colorado. The determination of Mount Shasta by means of many vertical angles gives it a height of 14,380 feet.—*Bulletin, American Geographical Society.*

CHINA WILL HOLD MANCHURIA.—The new Chinese-Japanese treaty gives Japan only a slight foothold in Manchuria. According to its provisions the lease of the Kwantung Peninsula will expire in 1923, Japan will evacuate Manchuria within eighteen months; there will be garrisoned consulates at New Chwang, Mukden, Antung, Kirin, Chang-Chung and other places; the military notes issued by the Japanese are to be redeemed rapidly; and their military administration shall lapse with the evacuation.

After the foregoing has been accomplished China proposes to keep a permanent garrison of 100,000 troops in the Shinking, Kirin and Amur provinces of Manchuria. Japanese officers will be engaged to command the troops. European diplomatists are said to have been made anxious by China's recent great strides toward becoming a military power. Enormous financial sacrifices, estimated at $600,000,000, spread out over twenty years, are being made to create a force to hold China for the Chinese.

The imperial army some years hence will consist of 1,250,000 men. Every man will serve three years with the colors and six in the reserve. With the new year this trained army will have reached 400,000 men, all provided with magazine rifles, modern field guns and European equipment. The cost of the army will be $40,000,000 annually. China now has a million rifles on order and will eventually possess 300 modern batteries.—*The Search Light,* December 23, 1905.

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